Industrial Alcohol Committee

1920

REPORT

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CHAPTER I.

1 The terms of reference to our Committee were—

(1) to consider and report to what extent and in what respect excise regulations now in force in the different provinces of India regarding the production, sale, storage and transport of industrial alcohol hamper the manufacture in India of such alcohol on a large scale ;

(2) to make recommendations for such modifications in those regulations as may be considered necessary, due regard being had on the one hand to the necessity of protecting the Government revenue and also the public safety and on the other hand to the desirability of encouraging the development of the manufacture of industrial alcohol in India ;

(3) to embody the recommendations made in the form of model rules which could be forwarded to local Governments for their consideration ;

(4) to consider whether the regulations regarding denaturants now in force in India are suitable and whether special denaturants should be allowed for alcohol required for use in special industries and if so, under what restrictions; and

(5) generally to make any recommendations which may be considered necessary regarding the issue of rules on the subject under the Petroleum Act or other matters.

2 The Committee was constituted as follows :—

President :

The Hon'ble Sir John Maynard, K.C.I.E., C.S.I., I.C.S., Financial Commissioner, Punjab.

Members :

1. Dr. N. L. Sheldon, Ph.D., F.I.C., Chief Inspector of Explosives with the Government of India.
2. Mr. R. L. Jenks, F.I.C., F.C.S., Chemical Examiner for Customs and Excise, Calcutta.
3. Mr. W. Neilson, Manager, the East India Distilleries and Sugar Factories, Limited, Nellikuppam, Madras Presidency.

Secretary :

Mr. J. B. Taylor, I.C.S., Under Secretary to the Hon'ble the Chief Commissioner of the Central Provinces.

3 The Committee met at Simla on Saturday the 28th August 1920 and sat until Saturday the 25th September 1920. As the terms of the reference confined the discussion to the rules and regulations of the Imperial Government and the various local Governments, no evidence was taken though certain minor experiments were carried out which will be detailed later.

CHAPTER II.

General.

I.– INTRODUCTORY.

4 Alcohol can be used for many industrial purposes, as will be seen from the statement given as an annexure to Chapter V at Appendix A. When applied to such purposes, it would obviously be unreasonable to levy duty or excise on it at the high rate imposed on alcohol intended to be drunk. The main difficulty which confronts the excise authorities and with which this Committee has been asked to deal is how to facilitate its use in industry without allowing it to be diverted to potable purposes, and so defraud Government of its revenue, and cause harm to the public by the uncontrolled distribution of an intoxicating liquid. The question has been brought to a head by the high prices of petrol and other motor spirits, which have led to research on all sides for a new power fluid, and in this connection the suitability of alcohol is apparent if it can be produced cheaply enough and given sufficiently unrestricted circulation.

5 We have had some difficulty in finding a satisfactory definition of the term "industrial alcohol," and in avoiding the purely subjective definition of "alcohol intended for industrial purposes." At first sight this would appear to be the only possible description, as there is no intrinsic difference between alcohol intended for potable or for non-potable purposes.

6 Possibly the best definition is "alcohol which is exempted from the excise duty leviable on potable spirit on the ground that it is intended for non-potable purposes." This will cover both pure alcohol and alcohol which has been denatured, that is rendered unfit (more or less completely) for human consumption. It will also cover the use of alcohol in experiment and research as distinct from purely commercial uses, where the object is to place the finished product on the market, but will exclude the use of alcohol in hospitals and in the preparation of medicines and tinctures. Industrial alcohol, as defined above, is alone dealt with by this Committee.

7 The British Inter-Departmental Committee on Alcohol Motor-Fuel suggest in paragraph 5 of their report that all alcohol for power or traction purposes should be described as "power alcohol." This is satisfactory so far as it goes, and we have made suggestions for the definition and regulation of such power alcohol. At the same time they suggest that the term "industrial alcohol" is unsatisfactory, on the ground that some sections of the community believe it to be alcohol for the working man. Such a misapprehension is not likely to arise in India. Power alcohol is a sub-division of industrial alcohol and we see no reason to abandon a logical classification.

II.—THE FIRST REFERENCE TO THE COMMITTEE

8 The first duty of the Committee was :—

(1) to consider and report to what extent and in what respect excise regulations now in force in the different provinces of India regarding the production, sale, storage and transport of industrial alcohol hamper the manufacture in India of such alcohol on a large scale.

9 The present rules about industrial alcohol vary in detail from province to province, but follow certain general lines regarding the denaturants to be employed which have been laid down by the Government of India. There are also restrictions on possession, transit or vend. These rules were designed purely from an excise point of view to safeguard the revenue, and were framed on the supposition that such industrial alcohol as was used would only be used in comparatively small quantities either by private individuals for cooking and similar purposes or by industrialists for the preparation of varnishes, medicines, perfumes and so on.

10 These provincial rules have been examined by us, and, granted a continuance of the conditions on which they were based, would appear to be generally satisfactory. Certain minor inconveniences attaching to them which we consider unnecessary, and which might be reconsidered, are described in detail in Chapter V where it deals with anomalies in the existing rules about the various forms of industrial alcohol.

11 If, however, it is intended that alcohol should be used for power purposes as an adjunct to petrol, it is clear that the existing rules will have to be altered so as to allow of its being handled in far larger quantities than have ever been considered practicable hitherto. The one question for consideration is whether it will be possible to relax the present restrictions without an abandonment of the control of spirit which may be used for potable purposes.

III.—THE SECOND REFERENCE TO THE COMMITTEE.

12 This brings us to our second reference, which is to make recommendations for such modifications in those regulations as may be considered necessary, due regard being had on the one hand to the necessity of protecting the Government revenue and also the public safety and on the other hand to the desirability of encouraging the development of the manufacture of industrial alcohol in India.

13 If relaxation of the rules is going to render evasion possible on a large scale, it is clear that Government will never tolerate the loss of revenue involved, nor public opinion the extension of drinking facilities in their most uncontrolled and deleterious form.

14 From the excise point of view, the question is one of a suitable denaturant. Generally, we assume that spirit is sufficiently denatured for practical purposes if the difficulty of rendering it potable is not less than the difficulty of distilling potable spirit from any other freely obtainable substance. It is unfortunately true that however repulsive denatured spirit may be made, there will always remain a small minority who will use it for potable purposes either by itself or by mixture with some other form of liquid, such as tea or mahua spirit. An active poison would defeat such persons, but, as will be seen later, the Committee is of opinion that Government would not allow the use of any active poison for denaturing purposes.

15 The essentials of a denaturant are therefore—

(*a*) that it should be so repulsive as to render the spirit non-potable by all save the negligible minority above referred to, however low the price and however wide the facilities of acquisition.

(*b*) that it should be miscible with the alcohol to such an extent as to prevent purification by filtration, redistillation or any other process, except at a cost or risk quite incommensurate with the results obtainable.

(*c*) that it should be cheap enough in price and otherwise commercially suitable to allow the resulting product to compete with existing forms of fuel in spite of the fact that the initial expenses of production will always be enhanced by the necessity of stringent Government supervision of the production of the original undenatured spirit.

(*d*) that it should be clearly discernible in as many ways as possible even by the non-expert without the aid of apparatus.

16 We are not prepared to say that the existing denaturant in use in India for ordinary purposes fulfils these requirements sufficiently to enable spirit denatured with it to be released entirely from excise supervision. We also consider that the present provincial regulations are so wide, that if we allow for the inevitable incompleteness of excise control in India as compared with other countries which are more advanced industrially, it would be impossible, under present conditions, greatly to lessen these restrictions without making them ineffective, at any rate in the country districts which still constitute the most important part of India from an excise point of view.

17 We have in the following chapter suggested a denaturant and certain experiments which might be conducted with it, and, if that denaturant, as we anticipate, proves satisfactory, or if another satisfactory denaturant should be devised, it should be possible to effect wide modifications in the present rules, and even to exempt suitably denatured alcohol from the operation of excise regulations altogether.

IV.—The Third Reference to the Committee.

18 It will thus be seen that in performing our third task, namely to embody the recommendations made in the form of model rules which could be forwarded to local Governments for their consideration, we are faced with two alternatives

19 The first is that a suitable denaturant will be devised, which will enable Government to allow alcohol so denatured unrestricted circulation so far as regards excise. The second alternative is that such a denaturant will not be found, in which case a continuance of present conditions will be necessary with, at most, minor modifications.

20 Rules framed according to these two alternatives will be found to be complementary rather than antagonistic, as however perfect the denaturant, there will always remain many uses for which otherwise denatured or undenatured spirit is necessary, and to these the existing regulations will be generally applicable.

21 We have based our recommendations in the ensuing chapters on the assumption that an adequate denaturant will be found, but while Chapters III and IV, on Power Alcohol, depend entirely on its discovery, Chapter V and the following chapters on the other forms of industrial alcohol would remain applicable whether it were discovered or not.

22 As the subject-matter is so problematical we have not ventured actually to embody our recommendations in the form of model rules but in the following chapters we have endeavoured to give them such a clearly defined shape that if circumstances arise to permit of their adoption, their transformation into rules will be a pure matter of routine.

V.—THE FOURTH REFERENCE TO THE COMMITTEE.

23 "To consider whether the regulations regarding denaturants now in force in India are suitable and whether special denaturants should be allowed for alcohol required for use in special industries and if so, under what restrictions."

24 This question is dealt with at length in Chapter V under the head of "specially denatured spirit."

VI.—THE FIFTH REFERENCE TO THE COMMITTEE.

25 Our last duty is generally to make any recommendations which may be considered necessary regarding the issue of rules on the subject under the Petroleum Act or other matters.

26 Questions affecting the Petroleum Act are discussed in Chapter IV which deals with questions affecting the public safety arising out of the use of alcohol for industrial purposes. In this connection the railway regulations are also alluded to. Questions affecting taxation and customs duties are dealt with in Chapter VII.

27 Certain mixtures of alcohol and other substances intended for power purposes appear to contain arsenic as a denaturant. It is doubtful whether this would

bring the mixtures within the scope of the Poisons Act, but the danger that spirit so denatured might lead to accidents even if no attempt were made to drink the mixture, and might also be used for criminal purposes, especially in this country, is so great that the Committee considers it impossible that Government would permit its adoption.

CHAPTER III.

Power Alcohol.

I.—GENERAL.

28 The present position is that though alcohol is used in many industries its use for power purposes, even if it could be purchased at a cheaper rate than at present, would be hampered by existing excise restrictions.

29 If alcohol is to become a valuable adjunct to petrol the facilities of storage and distribution will have to be very widely enlarged. The results of experiments which were made to determine the flash points, at various strengths, of pure denatured spirit and of the various mixtures which will probably be used are discussed in Chapter IV and given in detail in Appendix B. From these it is clear that to safeguard the public from the risk of fire, alcohol should logically be classified in the same category as "dangerous petroleum," and be brought under rules analogous to those under the Petroleum Act.

30 When we consider whether this end might be attained by an addition to the rules under the various Excise Acts, it will be seen that when alcohol is used for power purposes it would be preferable to make the rules under the Petroleum Act rather than under the Excise Acts, for the following reasons, among others.

(*a*) For the consumption of unmixed alcohol special engines will have to be constructed, while mixtures of alcohol with petrol, benzol, or ether would seem to run satisfactorily in ordinary petrol engines fitted with ordinary carburettors. It is therefore probable that alcohol for power purposes will normally be made up for retail sale in the form of some mixture or other. As petrol or other substances coming under the legal definition of petroleum when mixed with power alcohol will bring the resulting mixture within the scope of the Petroleum Act, it would appear more convenient to bring all alcohol to be used for power purposes under the Act as well.*

(*b*) The storage and sale of such alcohol and petrol will presumably be combined, and it would be awkward to have one-half of a store-house under the control of one authority and the other half under another.

31 If, however, alcohol for power purposes is brought under the scope of the Petroleum Act, while remaining under the Excise Acts, numerous inconveniences will ensue. There will be the necessity of double inspections and double licences, and the expense and inevitable delay involved would be a serious handicap to a new industry. Even if the present excise restrictions were much relaxed the dual control would probably cripple the production and use of alcohol on a large scale.

32 The alternative is to release alcohol for power purposes from the provisions of the Excise Acts and confine it to the Petroleum Act alone. This is a grave step, as it will involve the storage and distribution of such alcohol with a freedom never hitherto contemplated and if this relaxation were to render evasion possible, it is clear that the concession would be an impossible one for any Government to make.

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* See note at end of chapter.

33 For the reasons given above, however, we consider that, if a suitable denaturant is discovered, it would be advisable to free alcohol denatured with it from the scope of the Excise Acts.

34 It is probable that the production of power alcohol will be on a comparatively small scale at first and will only expand gradually. This will give Government an opportunity of judging whether any undesirable results follow from the exemption from excise control, and of retracing their steps, if necessary, before serious harm has been done.

35 Alcohol so denatured and liberated would be described as "power alcohol" to distinguish it from the other forms of denatured and undenatured industrial alcohol which would continue to be used subject to restrictions.

36 Power alcohol when issued from distilleries or imported from abroad may, and very possibly will, be used for other than power purposes. It is likely, for instance, to be used as an ordinary fuel. This will tend to diminish the consumption of ordinary denatured alcohol. This, however, will involve no loss of revenue to Government except in so far as the denatured alcohol which is displaced is imported and pays an import duty. We do not think that the possibility that ordinary denatured spirit may be ousted or partially ousted by power alcohol should deter Government from adopting our proposal to exempt power alcohol from excise control. If Government should, by reason of this risk, delay the issue of the notifications exempting power alcohol, we think there is a danger that attempts to put power alcohol on the market may be frustrated.

II.—SUGGESTIONS FOR A DENATURANT.

37 We are of opinion that the only denaturants which are satisfactory for Indian purposes are pyridine and light caoutchoucine. The reasons for their adoption as the standard denaturants for India were fully considered in 1906 and as they have stood the test of more than ten years employment it is unnecessary to enter on a defence of them here. The proportions in ordinary denatured spirit are ½ per cent. pyridine and ½ per cent. caoutchoucine: with the present restrictions this is sufficiently safe, but if the relaxation in the rules contemplated by us is to be effected, as an additional security we think the percentage of pyridine should be raised to 1 per cent. At present wholesale prices this additional pyridine would increase the cost of the alcohol by roughly 6 pies per gallon. For facility of recognition we also think it essential that some colorant should be added. The dye-stuff methyl violet appears the most suitable, the actual proportions being left to be determined by experiment.

38 All this would have to be put to the test of experiment to ascertain clearly and definitely:—

(*a*) that none of the proposed denaturants will be taken up or destroyed by any of the substances, such as petrol, benzol, or ether, which will probably be mixed with the alcohol.

(*b*) the amount of colouring matter that will be necessary to preserve a distinctive colour even in those various mixtures.

(*c*) that no other probable means of defrauding the revenue will subsist.

39 Separate experiments will also have to be carried out with engines of various types, and exact tests under actual working conditions should be made both with the denatured alcohol alone and with various benzol, petrol and ether mixtures to make sure that the proposed denaturants and colouring matters will have no deleterious effect on the engines. Otherwise the concession when granted might prove largely nugatory. From the reports of experiments conducted in Hawaii, and on theoretical grounds, we consider that the pyridine would play a useful part in neutralizing any acidity formed by the explosion of the alcohol, but we are not prepared to make a definite statement on a point which obviously can only be settled by detailed experiments. We did not think it necessary to delay the submission of our report until these experiments had been completed. They will necessarily take a considerable time, and if the suggested denaturant is not found suitable, another may be discovered, as research is proceeding on parallel lines in many other countries.

40 We are emphatically of the opinion that there should be only one type of denatured alcohol exempted from the Excise Acts, whatever that type might be. Otherwise, it will be almost impossible to avoid evasion. If any denaturant is subsequently discovered which yields more satisfactory results, it might be adopted, but only after careful experiment, and it would have to be substituted for the existing denaturant.

III.—QUESTION OF MANUFACTURE OUTSIDE BRITISH INDIA.

41 The principal difficulty in liberating such denatured alcohol from the Excise Acts is the making of arrangements for testing imports from outside British India. There are certain technical difficulties about testing denaturation, especially in the case of mixtures. These difficulties exist in the case of imports from Indian States, and would be enhanced in the case of denatured spirit imported from overseas. It would be possible to treat both on the same footing, but the Committee thinks it desirable to facilitate, if possible, the manufacture of power alcohol in Indian States, both in the interests of the States themselves and of the consumers in British India. If possible, concessions should therefore be made to allow power alcohol distilled in Indian States entry into British India under more favourable conditions than imports from overseas. There are two alternatives:—

(1) that the denaturation should be effected in the Indian State; and

(2) that the spirit should be imported into British India in bond as rectified spirit and denatured in British India, a course which we do not wish to recommend if it can be avoided.

42 With regard to the first alternative, there are two possibilities; the first, that the denaturation should be effected under the personal supervision of an excise official from British India, and the second, that the imports should be verified on their entry into British India. The latter procedure would entail delay pending the receipt of reports from a laboratory, which might, in many cases, be situated at a distance. The ordinary excise official using his ordinary test instruments would not be able even to gauge the strength of the alcohol in a power alcohol mixture, still less to determine the strength or character of the denaturants.

43 As spirit once admitted as power alcohol will be given unrestricted circulation, no local Government should be allowed to make any arrangements with any particular State for the release of power alcohol without reference to the Government of India

44 In view of these several alternatives, it seems useless for the Committee to go into further detail, as it will be necessary for the Government of India, after negotiation with the Indian State and the province or provinces concerned, to decide which of the alternatives is more suitable in each particular case. The best method, in the opinion of the Committee, is that the denaturation should be effected under the eye of a British India excise official at the distillery itself. This would seem to give the best results both from the excise and the chemical points of view.

45 Importation by sea presents a more difficult problem. It is obviously impossible to have British officials in foreign countries supervising the actual process of denaturation, and this will necessitate the tests being conducted at the actual place of import, unless the Government of India decide to restrict imports to rectified spirit alone. The latter course does not appear to be necessary. The imports of spirit purporting to be power alcohol or mixtures containing it should be restricted to certain ports, where facilities exist for testing and certifying consignments.

46 Where it is simply a case of transport by sea from one part of British India to another, power alcohol will by hypothesis already have been liberated from the Excise Acts, and no further action under these Acts would appear to be necessary.

IV.—SUGGESTED NOTIFICATIONS.

47 On these assumptions we suggest that the various local Governments might issue notifications, exempting "power" alcohol from the operation of their Excise Acts upon issue from the distillery, excise or customs warehouse. As alcohol so liberated will be given unrestricted circulation throughout India it is essential that the specifications of the denatured alcohol contained in these notifications should be identical.

48 These notifications might be issued on the following lines:—

49 (*a*) Power alcohol is spirit of not less than 55 degrees O. P., which has been denatured by the admixture of (light caoutchoucine, and crude pyridine wholly made from a mineral source, and coloured with methyl violet, in the following proportions) :—

NOTE (*i*).—The proportions and ingredients will have to be determined by experiment, and should be notified by the Government of India to the various local Governments as uniformity in this respect is essential.

NOTE (*ii*).—The British Alcohol Motor-Fuel Committee recommended in paragraph 13 of their report that the maximum proportion of water that could be added to alcohol, without detriment to its use for power purposes, was 1 to 9. This gives an over proof strength of about 58 degrees. In India, owing to climate conditions, 55 degrees would seem a satisfactory equivalent, but 50 degrees is too low.

50 (*b*) Spirit certified to be power alcohol by an officer duly authorized in this behalf by the local Government shall, on issue from the distillery, bonded warehouse, or other place at which denaturation is so certified, be exempted from the provisions of the Excise Act with the following exceptions:—

(*i*) The provisions regarding the renaturation of denatured spirit and its use for potable purposes.

(*ii*) The right of the excise authorities to enter and inspect premises used for the storage of power alcohol and to impound stocks where they have reason to suspect the foregoing offences.

(Note.—It would be tedious to specify the actual rules which are exempted, as they vary from province to province. The local Governments would, of course, specify the actual rules or notifications.)

51 (*c*) Power alcohol mixtures are mixtures of alcohol and other substance or substances, in which the alcoholic constituent satisfies the definition of power alcohol.

52 (*d*) Spirit purporting to be power alcohol and mixtures containing such spirit may be imported from outside British India subject to the rules under the Excise Act, the Indian Tariff Act, the Sea Customs Act, and the Petroleum Act governing denatured spirit, but shall not be released until they have been passed as fulfilling the prescribed tests by an officer duly authorized in this behalf by the local Government. Such officer may conduct these tests at the actual place of manufacture by arrangement with the Government of the place concerned. The consignments passed by an officer under the latter head shall be sent under a separate pass in each case to the importer in British India in receptacles sealed by him. Any expenses which may be incurred in converting imported spirit into power alcohol or in ascertaining that it has been so converted shall be paid by the importer or the manufacturer as the case may be. Imports from other parts of British India shall be subject to no restriction.

NOTE.—The intention of the above exception is to permit Indian States to secure the services of a British India excise officer for passing out consignments from their distilleries. It should be possible for the various Local Governments to grant a joint authorisation to one officer at each such distillery to pass the alcohol.

53 The official laboratory tests to ascertain the suitability of samples of the various denaturants will have to be given *in extenso,* in an appendix, but as they have yet to be finally determined by experiment, it seems unnecessary to elaborate them here.

V.—CONDITIONS OF MANUFACTURE.

54 As after issue power alcohol will be subject to no excise restrictions it is equally essential that the conditions of manufacture should be carefully scrutinized and should be uniform throughout all provinces. Indian States which undertake the manufacture of power alcohol for import into British India under the general supervision of a British India Excise officer should also have to adopt these rules. The suggestions of the Committee are that draft rules might be framed on the following lines:—

55 (*a*) A separate licence and bond for the manufacture of power alcohol will be necessary. We suggest that the bond might be for the amount of Rs. 1,000 as in the case of Bombay. In pursuance of our general policy that encouragement should be given to a new industry we make no definite suggestion as to the amount of the fee that should be imposed for the licence, but suggest that it should be as small as possible. The Bombay figure of Rs. 75 seems reasonable.

56 (*b*) The spirit should be denatured and stored in a room separate from any used for potable spirit.

57 (*c*) The denaturation process should be carried out in fixed vats in quantities of not less than 400 gallons at a time. There seems to be no objection to the denaturation of power, ordinary, or specially denatured alcohol in the same room so long as the local Government is satisfied that sufficient arrangements are made to prevent confusion. Each type of denaturation must be carried out in its own set of vessels.

58 (*d*) Samples from each separate container of the denaturants should be sent to an officer appointed by the local Government for analysis and approval before use.

59 (*e*) The colouring matter should be added at the same time as the denaturant.

60 (*f*) All mixing with other substances, such as ether or petrol, should be conducted in an entirely separate building outside the distillery, and should not be commenced until the power alcohol has been released by the excise authorities.

61 (*g*) To prevent delay, spirit so denatured may be issued without prior examination by the analyst. Samples of such spirit should, however, be taken to be tested by that officer from each batch. When spirit is certified to be insufficiently denatured the balance, if any, should not be issued until corrected.

62 (*h*) Arrangements should be made for checking the quantities of power alcohol issued and for comparing them with the amount of rectified spirit used for denaturation. A record of all issues should be kept by the excise authorities.

63 (*i*) For greater safety, a copy of the rules should be endorsed on each licence.

After this report had been sent to Press, it was ascertained that Bombay, Madras and the United Provinces were advised, in view of the petrol shortage of 1918. that the safest concession would be to allow car owners to mix for themselves ordinary denatured spirit with petrol, in convenient proportions, and it is understood that this advice was adopted. It is not known to what extent petrol consumers availed themselves of this privilege, whether mixing is still practised, what, if any, concessions in the rules regarding distribution of denatured spirit was made, or whether any undesirable results occurred.

CHAPTER IV.

Arrangements for securing the Public Safety through the Petroleum Act.

64 *General.*—From the preceding chapter it will be seen that though power alcohol is released from the operation of the various Provincial Acts, it will still be necessary to take measures for its regulation from the point of view of the public safety as it is a dangerous liquid. Appendix B gives the results of a series of enquiries conducted, at the request of the Committee, under the instructions of Mr. R. L. Jenks, one of the members of the Committee, in his laboratory in Calcutta. These show the flash-points of alcohol at various strengths, and mixtures of alcohol with other forms of combustible liquid which it is expected may be used for power purposes. From this it is apparent that the low flash-point of power alcohol at the strength recommended by the Committee would constitute a grave menace to public safety if it was given absolutely unrestricted circulation.

65 It would expand this report unduly were we to show in detail how the Petroleum Act is the most suitable measure under which power alcohol might be regulated. It should suffice to say that as petrol is a fluid which is similar in respect of high volatility and low flash-point to alcohol, the rules regarding it can most appropriately be made applicable to power alcohol.

66 *Suggested Notification and Rules.*—We accordingly recommend that a notification should issue under section 22 of the Petroleum Act bringing power alcohol, as defined in the various local Government notifications, within the scope of that Act and the rules under it. All these rules would appear to be applicable with the obvious exception of those regarding the refining and rectification of petroleum.

67 In addition, special rules might be drafted on the following lines:—

68 (*a*) When renaturation, or any offence against excise regulations, is suspected, the inspecting authorities should impound the consignment and notify the nearest excise authority.

69 (*b*) Power alcohol and power alcohol mixtures may be stored with dangerous petroleum in the same installation or storage shed provided that the joint amount does not exceed the amount for which the installation or shed is licenced for dangerous petroleum.

70 (*c*) All receptacles containing power alcohol and power alcohol mixtures should be clearly marked P.A. (power alcohol or P.A.M. (power alcohol mixture) in addition to markings required under the Petroleum Act. (There seems no necessity to add the words "non-potable".)

71 (*d*) All manufacturers of power alcohol mixtures shall supply the details of each such mixing on demand to any inspecting officer.

72 It is inadvisable to make any provision for the supply of water for extinguishing alcohol. Water is suitable for extinguishing alcohol, but simply tends to spread burning petrol. Sand is already provided under the Petroleum Act as an extinguisher and is perfectly satisfactory for all purposes.

73 *Import from outside British India.*—These rules will not bring the import of power alcohol within the scope of the Petroleum Act. Alcohol will not become power alcohol until liberated after the prescribed tests. A separate notification should therefore issue under section 22 of the Petroleum Act with regard to the import of alcohol. Such a notification should prescribe that all alcohol or mixtures containing alcohol imported "in bulk" by sea should be subject to the Petroleum Act and the rules under that Act so far as regards import.

74 "In bulk" is defined in Part I of the rules under Section 9 of the Petroleum Act as "in quantities exceeding 500 gallons contained in one receptacle". This will meet our object, which is to provide for the public safety in the event of spirit for power purposes being imported in large quantities by tank steamers, or in similar ways, while it will not lead to interference by the petroleum authorities with imports of ordinary alcohol, the rules regarding which appear to be sufficiently safe at present. It was suggested that the words "55 per cent. over proof" should be added to this notification. This appears inadvisable, as the petroleum authorities will not have the necessary apparatus for gauging proof, and on general grounds it is better that their standard should be a flash-point one with which they are already familiar. The words "by sea" will have the effect of excepting both imports from Indian States and inter-provincial transport. Another suggestion made was that the notification should cover "alcohol intended for power purposes." After some discussion this was rejected, on the ground that it was a subjective definition and that it would be impossible to ascertain the purpose for which each consignment of alcohol was intended. By exempting alcohol contained in receptacles of 500 gallons or less from the

scope of the Petroleum Act all alcohol not intended for power purposes will probably escape the Petroleum Act and be subjected to no further restrictions than exist at present.

75 *Railway Regulations.*—The Railway Board should* be approached to grant the same facilities to the transport of power alcohol as are now granted to dangerous petroleum. This will require the amendment of clause (*iv*) (*1*) of Corrigendum Slip No. 2, enclosed with the Railway Board's letter No. 313-T-19, dated the 2nd February 1920, namely:—

> (*iv*) (*1*) With the exception of "Industrial alcohol including Mhowa spirit" the inflammable liquids under serial No. 34 may be carried in Tank Waggons of a design approved by the Railway Board, and which must be in good condition and free from leakage when used for conveyance.

76 *Application of the Petroleum Act and Rules to other forms of alcohol.*—We have considered it necessary that the import of alcohol in bulk by sea should be brought within the scope of the Petroleum Act, though it will also have to remain under the Excise Acts until it is liberated after test. This double precaution is necessary as it is highly probable that in future import will be in much larger quantities and the necessity of securing the public safety will thereby be enhanced. On the other hand it appears unnecessary to extend the provisions of the Petroleum Act to cover the manufacture of alcohol in distilleries. Such manufacture is already under the

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*After the Report had gone to Press, it was learned that this concession had already been granted, *cf.*, Railway Board letter No. 292-T-16, dated the 18th August 1920.

control of the excise authorities, and it would be inadvisable to institute a dual control which would lead to confusion and unnecessary restrictions. At the same time the present regulations for securing the public safety appear to be somewhat haphazard, and we suggest that local Governments might be asked to draft rules under the various Excise Acts on the analogy of those under the Petroleum Act with a view to minimising the risks of fire in the distillery.

77 Though it is somewhat illogical to discriminate between alcohol for power and for other industrial purposes or even between alcohol for power purposes and any other alcohol having a flash-point below 76 degrees, and though the ideal would be that all regulations affecting the public safety with regard to dangerous liquids should be dealt with by one authority, we consider it unnecessary to suggest that the transport of other forms of alcohol should be brought under the Petroleum Act, as it is unlikely that their quantities will be largely increased and the present arrangements, defective though they may be in theory, appear to work satisfactorily.

78 We would also venture the opinion that the maximum limit of possession without a licence which is fixed by Section 6 of the Petroleum Act at 3 gallons, is too low, and the regulation prescribing that such quantity shall be kept in separate receptacles, containing not more than a pint, seems unduly hampering. It appears to us that those somewhat meticulous restrictions are a dead letter throughout the greater part of India, so far as petrol is concerned, and it would seem more reasonable to give quantities which there would be some possibility of enforcing. We accordingly suggest that the limit of private possession without a licence should be raised to

5 gallons and that owners of motor cars should be allowed to possess a maximum of 20 gallons. As in Bengal and the North-West Frontier Province, one licence could be made to cover both the motor car and the possession of the spirit, on the applicant showing that he had proper accommodation for it.

A copy of the Bengal rule is given below. Sanction for its adoption was conveyed in the Government of India letter No. 3786, dated the 31st May 1919 (Department of Commerce and Industry) to the Government of Bengal.

GOVERNMENT OF BENGAL.

MARINE DEPARTMENT.

List No. VII of corrections to the Petroleum Rules in force in Bengal.

No. 90 Marine—The 25th July 1919.—In exercise of the power conferred by section 9 of the Indian Petroleum Act, 1899 (VIII of 1899), and with the previous sanction of the Governor-General in Council, the Governor in Council of the Presidency of Fort William in Bengal is pleased to make the following amendments in the rules for regulating the importation, possession and transport of petroleum within that Presidency (published under Bengal Government Notification No. 143 Marine, dated the 3rd November 1914):—

Amendments.

1. *For* the words and figures "rules 13 and 14" in rule 1, Chapter IV, Part II of the said rules, *substitute* the words and figures "rules 9 (*1*), 13 and 14".

2. *For* sub-rule (1) of rule 9 of the same chapter, *substitute* the following sub-rule:—

9. (*1*) Licenses in Form F may be granted free of charge for the possession of dangerous petroleum for use on motor vehicles and for its transport thereon for the purpose of use therein:

Provided that the Commissioner of Police may, by an endorsement on a certificate of registration granted under the Motor Vehicles Act, 1914, authorise the owner of a motor vehicle to be in possession of dangerous petroleum not exceeding 20 gallons for use on the motor vehicle, or for its transport thereon, for the purpose of use therein, and such endorsement shall be deemed to be a license within the meaning of section 6 of the Indian Petroleum Act, 1899, and in such case a separate license in Form F shall not be necessary:—

Provided also that nothing contained in this rule shall entitle the owner of more than one motor vehicle to be in possession of dangerous petroleum exceeding 20 gallons without a license in Form F.

CHAPTER V.

Other forms of Industrial Alcohol.

79 *General.*—Even though power alcohol is entirely released from the operation of the Excise Acts, there will still remain many industrial purposes for which alcohol will be required and for which it will be unsafe to issue it without excise control.

80 The present rules about these remaining forms of industrial alcohol are generally satisfactory, and as it is unlikely that there will be any great expansion in their use, it is unnecessary to propose any drastic modification of the existing rules.

81 At the same time the possibility must not be ignored that the experiments to discover an adequate denaturant may prove unsatisfactory, and that it may in consequence be impossible to designate any form of alcohol as power alcohol and exempt it from excise control. Even in that case we consider that it would be inadvisable to effect any sweeping relaxations in the existing rules, as with the slight modifications proposed by us below, we think they go as far as is possible without abandoning effectiveness of control.

82 Our proposals are therefore made to fit two situations, firstly that it will be possibly to exempt a form of alcohol called power alcohol, and that the following suggestions for rules will consequently only apply to other forms of industrial alcohol, and secondly that there will be no power alcohol so exempted, and that these rules will have to cover all forms of alcohol intended for industrial purposes.

83 We think that these regulations should be systematised and brought together, so that manufacturers may realise the facilities that are being offered.

84 Alcohol (apart from power alcohol) which is intended for industrial purposes may be divided into three classes:—

1. Ordinary denatured spirit,
2. Specially denatured spirit,
3. Industrial rectified spirit including pure alcohol.

85 A statement given in Appendix A classifies the main uses of alcohol for industrial purposes under these three heads. From this it will be seen that many of the present uses of ordinary denatured spirit will still remain, as the colouring matter which we consider an essential ingredient of power alcohol will often preclude its use as a solvent and for similar purposes.

86 We consider that the ordinary denatured spirit at present in use in India is satisfactory, and there is therefore no necessity to change its specification. The suggested rules for its manufacture and distribution are given below.

87 Suggestions are also made for rules to regulate those industries which require alcohol denatured in some special way or not denatured at all.

Suggestions for Rules under the Provincial Excise Acts.

Ordinary denatured Spirit.

88 It should be a condition of every distiller's licence

that he should manufacture a certain amount of denatured alcohol on requisition by Government.

Note.—This will have the double effect of promoting the manufacture of denatured spirit and of encouraging the setting up of continuous stills as pot stills will be unable to distil spirit at the high over proof strength required. The latter object is also desirable from a purely excise point of view.

89 *Definition.*—At present there are two general definitions. One is that denatured alcohol is spirit effectually and permanently rendered unfit for human consumption. This seems unsatisfactory from a legal point of view as it ignores the possibility of re-naturation. A more satisfactory definition is "denatured with the general denaturant (to be subsequently defined)," and this definition we propose for general adoption.

90 *Specification.*—The present specifications are satisfactory and we recommend that they should be continued.

91 *Minimum Strength.*—In all provinces except Bengal the minimum strength is fixed at 50 degrees O. P. at the time of manufacture, and when there is a strength prescribed for retail sale that also is put at 50 degrees. It seems to the Committee that the possibility of a change in the strength between manufacture and retail sale has not attracted attention in these provinces. The Bengal rules lay down that the spirit at the actual time of manufacture shall be 55 degrees O. P. A difference of 5 degrees seems slightly excessive and may lead to dilution. The Committee is also advised that if a distiller is required to distil at the minimum strength of 55 degrees he must in practice aim at about 57 degrees O. P. to avoid the risk of the spirit falling below the standard. In some provinces it would be difficult for the stills to attain to 57 degrees O. P. without special appliances or an additional process of rectification, that is to say, without additional expense, tending to raise the price of the spirit and to discourage its manufacture. The Committee suggests that the minimum strength at the time of denaturation should be 52 degrees O. P. and at the time of retail sale should be 50 degrees O. P. as read by the hydrometer. The reason for this is that the addition of the denaturant usually causes obscuration to the extent of ½ degree of proof, and another 1½ degrees of proof should be allowed for possible losses of strength before actual sale.

92 *Places of manufacture.*—No change in the rules is proposed.

93 *Conditions of denaturation.*—

(*a*) Samples of each batch of denaturants are to be chemically examined by an officer nominated by the local Government. If these denaturants are the same as for power alcohol, there will be no objection to their being used from the same receptacles for both purposes.

(*b*) The larger industrial provinces provide that samples of each batch of denatured spirit should be sent for analysis. This is the ideal to aim at, but where smaller and less frequent quantities are denatured it would appear sufficient for the excise authorities of the province to call for samples at uncertain intervals, though not less than 4 times a year.

(*c*) There should be a separate room for storing denaturants. This must remain in the personal charge of the excise officer.

94 *Duty.*—No change is proposed.

95 *Conditions of import.*—

(*a*) *From outside British India.*—No change in the rules is proposed.

(*b*) *Interprovincial.*—

(*i*) It appears unnecessary to impose any restriction on the movement of ordinary denatured spirit up to the limits of private possession. Where such restrictions remain, we suggest their abolition.

(*ii*) We would also like to see the restrictions on the movement of larger quantities removed, but recognise their inevitability in the case of provinces which do not come into line with regard to the rules about testing samples of the denatured spirit. The question does not appear of great moment, as provinces which do not prescribe examination of samples for each batch have presumably little or no export trade. As soon as a province has any prospect of exporting denatured spirit, it will be necessary for it to adopt the rule requiring the testing of each batch of denatured spirit.

96 *Conditions of export.*—No change.

97 *Conditions of transport.*—No change.

98 *Wholesale Vend.*—The existing rules appear to be sufficiently wide, and no change is required.

99 *Retail Vend.*—No change is suggested. The various differences in the rules have probably been dictated by provincial conditions, and any *a priori* alteration of them would lead to practical difficulties.

100 The limits of private possession prescribed by local Governments vary from 1 to 5 gallons and in some provinces the rules take the form of a prohibition against any retail vendor issuing more than a certain amount to an unlicensed individual in one day. A more satisfactory method would be to fix definite limits for private possession without a licence. To facilitate the use of ordinary denatured spirit this limit might be fixed at 5 gallons. A smaller maximum might cause inconvenience to individuals in country districts at a distance from retail shops.

101 *Fees for Licenses.*—As the Government of India have removed the duty on denatured alcohol when the spirit is made in India with a view to encouraging the industry, it is suggested that fees for licences for wholesale and retail vend might be abolished, or, if this is impossible, that they might be reduced to merely nominal sums, such as for instance Rs. 2 to cover the cost of registration.

SPECIALLY DENATURED SPIRIT.

102 Some local Governments have made provision for the use of this under proper safeguards, but others have no special regulations. It is suggested that all should make clear provision for its use, with proper precautions, on the following lines:—

103 We are averse to laying down any definition of specially denatured spirit or specifying any minimum strength. In fact any general rules would appear objectionable, such as restrictions on the quantities that may be manufactured at any one time, or the quantities that may be issued to licencees. The British rules contained in section 3 of the Finance Act, 1902, are cast on general lines and would appear the safest guide to follow. They are—

(*i*) Where in the case of any art or manufacture carried on by any person for which the use of spirit is required, he shall prove to the satisfaction of the Commissioners of Customs and Excise that the use of methylated spirit* is unsuitable or detrimental, they may, if they think fit, authorise that person to receive spirits without payment of duty for use in that art or manufacture upon giving security to their satisfaction that he will use the spirits in that art or manufacture and for no other purpose, and the spirits so used shall be exempted from duty, etc.

(*ii*) The authority shall only be granted subject to the compliance with such regulations as the Commissioners may require the applicant to observe for the security of revenue and upon condition that he will, to the satisfaction of the Commissioners, if so required by them, render the spirit impotable before use.

104 Provincial Governments should draft rules on these lines. To ensure uniformity of policy throughout India, all applications for special denaturants ought to be referred by the local excise authorities to one central adviser for opinion, though the discretion of granting licences would remain with the local Government. The conditions on which such licences were granted, with a brief account of the nature of the firm and the manufacture to which they were given, might be communicated to other provincial Governments, and might possibly be summarised in an annual general report, due regard being had to any trade secrets involved.

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*In India this would be ordinary denatured spirit.

105 Expressions like "methylated spirit" or "spirit denatured with wood naphtha" should be excluded from the rules. Methylation is the mixture of alcohol with methyl alcohol usually in the form of wood naphtha. Thus "methylation" is the correct term for defining the process of denaturation employed in Great Britain, and accordingly methylated spirit is the principal form in which denatured spirit is imported into this country. It has been conclusively proved, however, that methylated spirit is not sufficiently non-potable to justify its being placed in the same footing as the ordinary denatured spirit now used in India. In the words of Sir Charles Bedford, which, though written in 1906 when the present denaturants were proposed for adoption, appear equally applicable to-day, methylated spirit constitutes " a less offensive beverage than certain country liquors at present being sold throughout India," and can be rendered potable by admixture with mahua spirit. Methylated spirit must therefore be treated on the same lines as other specially denatured spirit, and there is no reason why special rules should be provided for it.

Note.—In this connection we would like to insist that no methyl alcohol should be used in the preparation of any medicine or beverage where the spirit remains in the finished article. A rule to that effect exists in the Bombay regulations, and in view of its well-known deleterious effects, we think that it should be made general.

INDUSTRIAL RECTIFIED SPIRIT.

106 The present rules about rectified spirit deal with its use both for potable and industrial purposes. The former are concerned with the blending of foreign

liquors, the manufacture of factitious liquors, the making of medicines, tinctures and so on. In all these cases full duty is paid, and they would seem to be outside the scope of this Committee's consideration. To avoid confusion, all rules regarding the use of rectified spirit for potable purposes ought to be entirely separate from the rules regarding its use for industrial purposes, and the Committee would propose to include in the former rules for the issue of rectified spirit to hospitals, dispensaries, scientific and teaching institutions, because in these cases the uses cannot be definitely specified. The use for industrial purposes alone will be dealt with here.

107 Industrial rectified spirit may be defined as "undenatured ethyl alcohol of a strength of not less than 60 degrees O. P. which has been issued for industrial purposes by an officer duly authorised in that behalf by the local Government." Attempts at a more elaborate definition seem to be unnecessary.

Note.—The O. P. strength has been fixed at this high figure to minimise the risk of confusion with ordinary potable spirit. Rectified spirit for industrial purposes is required at this high strength in order to secure the necessary standard of purity.

108 Licenses for its use for industrial purposes free of duty should be granted on the same lines as those for specially denatured alcohol, but would necessarily require a greater stringency of conditions. In fact the manufactures for which its use is necessary seem to be negligible at present, as will be seen from the statement. The only reason for its inclusion is that the Committee wishes to provide for possible future development. All applications should therefore be referred to one central expert adviser for his opinion before they are granted.

109 *Place of Denaturation.*—We also considered the question which special denaturants should be applied at the distillery and which at the actual manufactory. A column has been added to our statement showing this. It is obviously preferable from the excise stand-point that, where possible, such denaturation should be done at the distillery, custom house or bonded warehouse where there will be complete excise control, but this should not be insisted on where it will be detrimental to the industry. Local Governments are in the best position to judge of the requirements of the actual industry and the standing of the firm which submits an application. When approved firms apply for permission and show reasonable cause, there appears no reason to refuse to allow them to denature at the actual places of manufacture under proper scrutiny and supervision. Several of the local Governments permit this already, and, though unwilling to prescribe detailed rules, we suggest that our statement might form a guide to the various local Governments, to show them where it would be advisable to grant permission and where to withhold it.

CHAPTER VI.

Arrangements for a Central Expert Adviser.

110 As was shown in the previous chapter, in order to secure a general uniformity of procedure throughout India, arrangements will have to be made for the chemical examination of the various forms of industrial alcohol, and for expert advice on applications received by provincial Governments for the use of specially denatured or rectified spirit for industrial purposes. The present arrangement is that such questions are referred to the Chemical Examiner for Customs and Excise, Calcutta, who is the officer in charge of the combined Customs and Excise Control Station at Calcutta. This officer is under the Bengal Government but he is at times consulted by the Government of India and is required to deal with references from local Governments and to correspond direct with their excise authorities. As, however, he is under the authority of one local Government, he cannot leave the province without its consent. With this last exception these arrangements appear satisfactory, and the facilities offered are well utilised by provincial Governments, even by Bombay and Madras which were at first inclined to make their own arrangements.

111 In the light of the Chemical Services Committee Report, the Committee has the following suggestions to offer :—

112 It is essential that there should be a Central Adviser for the examination of all applications for the use of specially denatured or rectified spirit. This is necessary because the important questions at issue are not analytical, but can only be decided after consideration of the actual conditions of manufacture and practical experience of the working details involved. For this reason the Central Adviser ought to have his office in a large industrial centre, where he will be in immediate touch with commercial requirements. The present arrangement whereby his office is situated in Calcutta seems satisfactory. In addition, the Central Adviser ought to conduct the ordinary provincial routine work of the province in which his office is situated and that of adjacent provinces, if they have no local facilities for analysis. This is necessary in order to give him a body of work which will keep him in touch with the varied excise requirements of an industrial province.

113 If provincial laboratories are started, as proposed by the Chemical Services Committee, they might be asked to undertake such routine work as the testing of denaturants and the finished denatured spirit. They might also test samples of special denaturants once the licence for their use had been granted. They might in addition test mixtures imported from outside British India which purported to be or to contain power alcohol. This procedure will obviate the necessity of constant routine references to the Central Adviser, and the delays entailed thereby. Where power alcohol is manufactured outside British India under the personal supervision of a British India excise officer, as recommended by the Committee, the Government of India might arrange for some such provincial laboratory to test and pass the denaturants used and to check samples of the denatured spirit.

114 Though the Central Adviser would carry out the routine work of the province in which his office was situated, it would be necessary for him to be able to move about to make investigations on the spot when necessary. At present, if required to visit another province, his services have to be lent by the local Government. This procedure seems unduly cumbrous as it necessitates correspondence between the local Governments concerned. We suggest that he ought to be enabled to tour, and make local inspections or investigations on the spot for the purposes of his work. Reports would, of course, as at present be made to the local excise authorities concerned.

CHAPTER VII.

Taxation.

115 *General.*—At present denatured alcohol produced in this country is free of tax, but if imported from abroad it is subject to a tax of 7½ per cent. *ad valorem.* The effect of this discrimination is to compensate the Indian manufacturer for any expense incurred on account of excise supervision.

116 So far as regards the ordinary industrial uses of denatured alcohol, we consider the present arrangements satisfactory. We have dealt with industrial rectified spirit elsewhere.* There remains only the case of power alcohol, which is not so simple owing to the fact that there is at present a tax on motor spirit. Under the Motor Spirits (Duties) Act, 1917 (II of 1917) motor spirit, which includes any liquid containing hydrocarbon, *e.g.,* petrol and benzol, is subject to a duty at the rate of 6 annas on each imperial gallon if manufactured in India, and 7 annas 6 pies per gallon if manufactured abroad. Thus any mixture of power alcohol with these will be subject to duty at that rate.

117 We hold that it would be inadvisable to impose any tax on power alcohol for the following reasons :—

118 (*i*) Power alcohol prepared according to our suggested specification would bear charges estimated at 2.8 annas per imperial gallon on account of denaturants added as a protection to public health and revenue.

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*Paragraph 108.

119 (*ii*) Power alcohol imported from abroad would bear in addition a tariff of 7½ per cent *ad valorem* which is equivalent at the current spirit price of Rs. 3 per imperial gallon to a charge of 3.6 annas per gallon.

120 (*iii*) Power alcohol made from imported molasses, in addition to the charges for denaturants, bears the tariff of 10 per cent. *ad valorem* on imported molasses. If the current tariff value of molasses is taken, namely Rs. 6-6 per cwt., the charge amounts to 10.2 annas per cwt. and as the outturn of power alcohol from 1 cwt. is likely to average 3.54 gallons the charge per gallon is 2.88 annas.

121 (*iv*) We are advised that according to a normal estimate the charges incurred by importers and manufacturers respectively in supplying staff to assist in Customs and Excise control amount to 0.25 annas and 0.5 annas per gallon respectively.

122 Tabulated, the above charges come to :—

	Power Alcohol (imported).	Power Alcohol (made from imported molasses).
Denaturant charges . .	2·8	2·8
Tariff	3·6	2·88
Staff	·25	·50
Total . . .	6·65	6·18

123 The charges on power alcohol would therefore be higher than the present charge on petrol of 6 annas per gallon.

124 Power alcohol made from Indian molasses would bear only the cost of the denaturants and staff charges which amount to 3.3 annas per gallon, but the production of potable spirit and tobacco manufacture easily absorb the whole Indian production of molasses, and a surplus for the manufacture of power alcohol is not likely soon to be available. The same may be said of other existing indigenous bases.

125 We therefore suggest that to impose any tax on power alcohol would cripple the industry, which is already handicapped in comparison with petrol. When power alcohol or a mixture of power alcohol and ether is mixed with any motor spirit on which duty is payable, the duty should be levied on that constituent only, and not on the power alcohol or on the finished product.

126 In pursuance of the policy of facilitating the manufacture of power alcohol in Indian States we suggest that the 7½ per cent. import tax should be remitted in the case of imports of power alcohol from Indian States which have been passed out from their distilleries under the supervision of a British India excise officer.

CHAPTER VIII.

Miscellaneous.

FACILITIES FOR RESEARCH AND EXPERIMENT.

127 It is highly desirable that all possible facilities should be granted to *bona fide* researchers who desire to make experiments either for new sources or for new uses of alcohol. Such permission should be granted subject to the general condition that the products of the experiments shall not be placed on the market without further sanction. Any alcohol so produced should be disposed of according to the orders of the excise authorities who could permit its sale subject to the payment of duty or on such other conditions as they see fit. Subject to this restriction, there appears no reason why facilities should not be widely granted to firms or individuals of standing subject to their execution of bonds to prevent fraud. In all cases of doubt a reference should be made to the central expert adviser for opinion.

128 It is suggested that such licences might take the following form :—

129 (*a*) *Experiments for new sources of alcohol.*—The application should show—

(*i*) The sources from which it is expected to produce the alcohol.

(*ii*) The scale on which the applicant intends to conduct his experiments, showing the capacity of the still or stills.

(*iii*) The length of time which it is anticipated will be required.

The licence should embody these points, and in the opinion of the Committee should never run for more than 6 months, but should be renewable for similar periods, if necessary. The licences should be free of fee.

130 (*b*) *Experiments for new uses of alcohol.*—Such experiments will only require a licence if conducted with ordinary, specially denatured or rectified spirit, and their general lines will be the same as those of ordinary industrial licences. They should, however, be limited in point of time, as in the previous case, and might be granted free of fee.

APPLICATION OF EXCISE REGULATIONS TO OTHER FORMS OF ALCOHOL.

131 We have also considered the use of other forms of alcohol. At present methyl alcohol is not manufactured in India, but there is no reason to suppose that it may not be manufactured at some future date ; and as, if sufficiently purified, it is potable, it would seem advisable that imports should continue to be tested as at present, and that distillation (if the industry is introduced into India) should be under excise control. Propyl, butyl, and amyl (fusel oil) alcohols may be regarded as non-potable.

CASES WHERE ALCOHOL REMAINS IN THE FINISHED PRODUCT (SPIRITUOUS PREPARATIONS).

132 If it is desired that any such spirit should be exempted from duty Government will first have to be satisfied that the finished product will be non-potable and the alcohol in it non-recoverable in a potable form. There are two ways of testing this non-potability. The first is that the test should be a purely chemical one, and the second that Government should satisfy itself in each case that there is no practical risk of the product being treated as potable, or the alcohol in it recovered in a potable form. Of these two we recommend the second, as it is the method which is employed at present and is the more adaptable to actual conditions. Where there is any doubt on the matter the opinion of the central expert adviser should be obtained.

133 We have considered several of the more common industrial products of this nature, and our suggestions on them are as follows :—

134 (*a*) Perfumes and toilet preparations in which the alcohol remains in a potable form are not at present exempt from duty, and there appears to be no reason to exempt them.

135 (*b*) Exemption should, as in Bombay, be normally granted to medicinal preparations for external use such as liniments and embrocations, manufactured from methylated spirit (in the proper sense of the term), as such preparations are imported at present from Great Britain at the lower *ad valorem* rate. Though such preparations are impotable *per se,* they give by distillation a spirit which is technically potable, but the risk of fraud in their case appears trivial and may be disregarded.

136 (*c*) Varnish and finish.—These two preparations when made with ordinary denatured spirit may be definitely considered to be non-potable. Varnish made with specially denatured spirit (usually 5 per cent. methylated) is frequently imported, and hitherto has paid only the tariff duty of 7½ per cent. *ad valorem*. It has been represented that Indian made varnish and French polish of high quality is at a disadvantage because the peculiar odour of ordinary denatured spirit excites suspicion or distrust, especially when attempts are made to place the products on a foreign market. This seems a reasonable complaint and permission to manufacture for sale with spirit similar to that in the imported article should be given under the usual conditions for the use of specially denatured spirit in factories.

137 (*d*) *Ether.*—In the manufacture of ether, a portion of the spirit used survives in the finished product as potable alcohol. Even when denatured spirit is used it becomes re-natured so that in both cases the ether pays some spirit duty unless this alcohol is specially removed. Ether is usually manufactured in bond and this allows the manufacturer to avoid payment of duty by washing out the alcohol before the issue of the ether from bond.

138 (*e*) Generally speaking, permission to manufacture for sale preparations made with ordinary denatured spirit might be freely accorded, always provided that the nauseous odour and taste of the spirit is clearly discernible and is not disguised by strongly scented oils or other ingredients of the preparation. Such disguise is technically an offence, but doubtful cases should be referred for opinion on their merits because there is a possibility that co-ingredients of the mixture may extenuate the offence.

ETHER IN RELATION TO THE PETROLEUM ACT.

139 It is highly probable that if power alcohol is used on a large scale it will be used in mixture with ether. From the point of view of public safety, ether is an even more dangerous liquid than alcohol, and if it is to be used in large quantities precautions will have to be taken. For power purposes it is unlikely that pure ether will be used, and as already indicated commercial ether contains some 10 per cent. of pure alcohol, on which it is at present subject to duty. Thus, if it is intended to mix ether and alcohol, provision should be made for the mixture to be made in bond, to avoid the necessity of either eliminating the alcohol contained in the ether or the payment of duty on it. The operation will, therefore, be under the control of both the excise and the petroleum authorities, and on issue from the distillery the mixture as containing power alcohol will be within the scope of the Petroleum Act in the ordinary way.

140 It is hardly likely that ether, unmixed with power alcohol, will ever be used for power purposes. If it is so used, it will have to be brought under the Petroleum Act in the same manner as power alcohol. If unmixed ether is merely used for its present purposes it will only be required in comparatively small quantities, and for this the present regulations seem adequate.

CHAPTER IX.

Findings and Recommendations.

Findings.

REFERENCES TO PARAGRAPHS.

141 The more salient points of the present provincial excise regulations may be summarised as follows :—

142 The present regulations offer adequate facilities for the use of industrial alcohol on its present scale. If, however, industrial alcohol is to be used in large quantities, they offer serious obstacles, especially to distribution. Careful supervision appears to be inevitable, as it would be unsafe to liberate alcohol, as at present denatured, from excise control, and if such control is to be effective, it is impossible further to relax the existing restrictions. If, however, the denaturant proposed by the Committee for power alcohol proves suitable, or if another suitable denaturant should be discovered, there seems to be no reason why these restrictions could not be abandoned, and the Committee has framed proposals accordingly. 4–53

143 The restrictions on production appear necessary, and will have to be maintained even though those on sale, storage and transport are relaxed. In fact the release of power alcohol from all excise restrictions after issue from the distillery increases the necessity of stringent control over its manufacture. 54–63

144 One possible obstacle to the manufacture of industrial alcohol is the seeming confusion of the rules about it. In the first place, the uses of alcohol for 79–109 (Ch. V.)

industrial and for potable purposes are not clearly distinguished. The regulations concerning these uses should be entirely separate, and we have framed proposals accordingly. There also appears to be a certain confusion running through the rules of Provincial Governments between methylated spirit and ordinary denatured spirit. Methylated spirit is the description of alcohol denatured according to the British methods, that is to say, ethyl alcohol mixed with methyl alcohol usually in the form of wood naphtha, and must in India be classed as specially denatured spirit. The words "methylated spirit" should never be used to denote ordinary denatured spirit. This confusion has given rise to a certain amount of mis-apprehension on the part of outside applicants. If our suggestions about the redrafting of the rules are adopted, there should be no cause for mis-apprehension on the part of the public, and manufacturers would be in a position to realise more fully the facilities which are offered even under the existing regulations.

145 There are various minor local restrictions on the sale and transport of certain forms of denatured spirit. We do not think it advisable to interfere with these, as they are obviously inapplicable to the use of industrial alcohol on a large scale and have been dictated by provincial conditions. To suggest alterations without giving the local Governments concerned an opportunity of stating the case for their retention would be likely to lead to practical difficulties without any compensating advantage.

146 The regulations about the fees to be imposed on licences for production and vend vary considerably from province to province. Some provinces grant 54,101.

licences free of charge, and we consider that this is the most desirable course.

147 Another point which is not clearly brought out in the various provincial regulations is the amount of wastage allowable in re-distillation where rectification is performed by that method. This varies so much according to local conditions that it would be impossible to prescribe any general percentage. Each local Government, however, should after experiment lay down a general amount, and allow for variations according to special conditions. Then in each case the actual amount of wastage permissible could be specified in the licence.

148 Another obstacle to the production of industrial 75
alcohol which we think might be mentioned here, though it does not come under the various excise regulations, is the restriction imposed by the Railway Board on the transport of alcohol in tank waggons. The Committee has recommended its abolition. Even where alcohol remains under the control of the excise authorities it would appear somewhat illogical for the Railway Board to impose any further restrictions on its transport than would be required for power alcohol under the Petroleum Act, as the Railway authorities are merely concerned with the question of safety.*

Summary of Recommendations.

149 The following recommendations are made :—

150 (*i*) Experiments should be made with alcohol at 55 37
degree O. P. denatured with $\frac{1}{2}$ per cent. light caoutchoucine and 1 per cent. pyridine prepared according to the authorized specification, and a proportion of methyl violet to be determined by the experimenter.

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* *Cf.* Footnote to paragraph 75 *supra.*

151 (*ii*) Such experiments should first be made by the officer-in-charge of the Combined Customs and Excise Control Station to determine whether the alcohol so denatured could be safely released from all excise restrictions except those regarding re-naturation.

152 (*iii*) If these experiments yield a satisfactory result, further experiments should be made on a programme to be drawn up by that officer to determine whether the spirit so denatured could be used in the ordinary type of internal combustion engine without deleterious effect. 39

153 (*iv*) If these second experiments are also satisfactory, or if, in the interim, some alternative method of denaturation is discovered which yields more satisfactory results, one such denaturant should be adopted by the Government of India as the standard method of denaturation for the manufacture of power alcohol in India. 40

154 (*v*) This standard method should be communicated to all local Governments, who should be asked to define alcohol denatured by such method according to prescribed rules as " power alcohol " and to exempt it from the operation of their Excise Acts, with the exception of the penal clauses against re-naturation, and to exempt imported alcohol or mixtures containing it when they are satisfied that it has been so denatured. 47 63

155 (*vi*) A general notification should be issued under section 22 of the Petroleum Act, bringing power alcohol as defined and exempted by the various local Governments in recommendation 5 above within the scope of the Petroleum Act and the rules framed thereunder, with the exception of the rules regarding refining and rectification of petrol, and laying down certain additional rules for its regulation. 64–72

156 All local Governments should be requested to revise 79–109
their rules regarding other forms of industrial alcohol, so as clearly to discriminate it from alcohol intended for potable purposes, and to provide for the grant of special licences—

(*a*) for experiments in the production and new uses of alcohol,

(*b*) for the use of rectified or specially denatured spirit in industries.

157 They should also bring their rules into conformity in 93-95
various minor matters, especially as regards denatura-
tion tests, the permissible quantities for private 100
possession, and the retail strength of ordinary denatured 91
spirit.

158 Alcohol imported into British India in bulk should 73-74
be brought, by special notification, within the scope of the Petroleum Act and its Rules so far as regards import, in addition to the existing restrictions under the Excise and Customs Acts.

159 The Railway Board should be approached to grant 75–148
the same facilities to the transport of power alcohol as are now granted to dangerous petroleum.*

160 The Petroleum Act should be amended to raise the 78
limit of private possession of "dangerous petroleum" to five gallons. Owners of motor cars should also be allowed to possess up to twenty gallons without the necessity of taking out a separate licence.

161 Local Governments should frame rules under their 76
Excise Acts analogous to those under the Petroleum Act, for securing the public safety.

**Cf.* Footnote to paragraph 75 *supra.*

162 To regularize and facilitate the industrial use of alcohol, a central expert adviser is necessary, who would be able to tour freely and assist local Governments with his advice, and help to co-ordinate the arrangements in the various provinces for affording advice and facilities to manufacturers and experimenters. **110, 114**

163 Power alcohol should be exempt from duty under the Motor Spirits Act. **115, 125**

164 The 7½ per cent *ad valorem* tax on imports of denatured spirit should be remitted in the case of imports of power alcohol from Indian States. **126**

CONCLUSION.

165 The Committee desires to record its obligations to its Secretary, Mr. J. B. Taylor, I.C.S., who rapidly obtained a grasp of the subjects referred to us, assisted effectively in the discussion of many of them, and put the draft of our report before us within a very short time after we had reached our provisional conclusions.

H. J. MAYNARD.

N. L. SHELDON.

R. L. JENKS

W. NEILSON.

APPENDIX A.

(*Cf. Chapter V.*)

Statement of Industries in which Alcohol is used with Suggestions as to the Form in which Permission might be granted for its use.

A.—*Intention of the Statement.*

This statement is given purely for information. It is not intended that local Governments should act on it in granting licences for the use of alcohol in industry, except in the case of ordinary denatured alcohol. The list should, however, be a useful guide to local Governments and to applicants for licences, as showing when the central expert adviser would normally recommend sanction.

B.—*Omissions.*

1. Power alcohol, as defined in Chapter III.

2. Spirituous preparations in which alcohol remains in the finished product in a potable form, with the exception of ether.

3. The use of alcohol for experimental purposes. This is dealt with in Chapter VIII.

C.—*Explanation of Details given in the Statement.*

(*i*) The first column gives the manufacture in which the alcohol is used.

(*ii*) The second column gives the form in which the alcohol might be employed. O stands for ordinary denatured spirit, S for specially denatured, and Pure for industrial rectified spirit as defined in Chapter V.

(*iii*) The third column gives the suggested place of denaturation, which will be either the distillery or the place of manufacture of the product, the " factory." (*Cf.* Chapter V "Place of Denaturation.") In this column the word distillery includes customs or excise bonded warehouse.

(*iv*) The fourth column suggests methods and formulæ for the industries requiring specially denatured spirit, giving the name of the country where such formula has been actually adopted.

Manufacture.	Form in which the alcohol might be employed.	Denaturation.	
		Suggested place.	Suggested method.
Aldehyde and Formaldehyde.	O	Distillery	......
Alkaloids and fine organic Chemicals.	S	Distillery	5 per cent methylated (British industrial methylated).
Analytical and scientific purpose.	Pure	......	......
Artificial ~~Flame~~ Flavouring	S	Distillery	5 per cent methylated (British industrial methylated) usually dyed.
Celluloid (see Pegamoid)	S	Factory	Addition of 5 per cent of Acetone and 25 per cent of Ether (Belgium).
Chloral Hydrate	S	Factory	Addition of Chlorine (France)
Chemicals (fine inorganic).	O	Distillery	......
Bromoform	S	Factory	Addition of Bromine.
Collodion	O	Distillery	......
Crape	O.S.	Do.	For black, ordinary should suffice, but for white and colours British industrial methylated would be more suitable.
Disinfectants	O	Do.	......
Domestic and general requirements.	O	Do.	......
Dressings surgical	S	Factory	Soap Solution.
Dyeing and cleaning	O	Distillery	......
Dyestuff Intermediates (Methyl and Ethyl Aniline)	O	Do.	......
Impotable embrocations, Tinctures and Liniments.	S	Factory	5 per cent methylated (British industrial methylated).

Manufacture.	Form in which the alcohol might be employed.	Denaturation.	
		Suggested place.	Suggested method.
Ether	O ...	Distillery ...	......
Explosives	O ...	Do. ...	......
Ethyl Chloride and Bromide.	O ...	Do. ...	......
Extracts (medicinal solid)...	S. & Pure	Do. ...	5 per cent methylated (British industrial methylated).
Fireworks	O ...	Do. ...	......
Finish	O ...	Do. ...	......
Fulminates	S. or Pure	Do. ...	......
Hats	O ...	Do. ...	......
Incandescent Mantles ...	O ...	Do. ...	......
Inks	O ...	Do. ...	......
Iodoform	S ...	Factory ...	Addition of Iodoform (Germany).
Lacquer	O ...	Distillery ...	......
Medicines, Cattle ...	O ...	Do. ...	......
Oilcloths	O ...	Do. ...	......
Pegamoid and similar materials.	S ...	Factory ...	Addition of 5 per cent of Acetone and 25 per cent of Ether (Belgium).
Photographic materials ...	S ...	Distillery ...	5 per cent methylated (British industrial methylated).
Preservative materials ...	S ...	Do. ...	5 per cent methylated (British industrial methylated).
Rubber	O ...	Do. ...	......
Silk, artificial ...	S ...	Factory ...	Addition of 3 per cent. of Guncotton and 2 per cent. of Ether.

Manufacture.	Form in which the alcohol might be employed.	Denaturation.	
		Suggested place.	Suggested method.
Soap making ...	S ...	Factory ...	Soap solution and/or methylated spirit.
Solidified Spirit ...	O ...	Distillery ...	......
Synthetic Drugs (Phenacetin, Antipyrin, etc.)	S ...	Factory ...	......
Tannic Acid (pharmaceutical.	Pure ...	......	......
Textiles	O ...	Distillery ...	......
Vinegar and Acetic Acid ...	S ...	Factory ...	Addition of certain proportions of vinegar or acetic acid to alcohol.
Various Esters ...	S ...	Do. ...	10 per cent. from previous residue. 10 per cent. sulphuric acid 66° Be.
Varnish Stains and Paints	O ...	Distillery ...	......
Tobacco	S ...	Factory ...	......

APPENDIX B.

(*Cf. Chapter IV.*)

Flash points (approximate) of spirit of various strengths from absolute alcohol downwards, of various spirit mixtures and of certain other liquids, tested in accordance with the directions in the first schedule of the Indian Petroleum Act, 1899.

(The flash-point for dangerous petroleum is below 76 degrees F.) [Petroleum Act.]

(*a*) Absolute Alcohol—	
75·3° O. P.	55·3 degrees F.
(*b*) Rectified Spirit—	
60° O. P.	56·3 ,, ,,
50° ,,	59·3 ,, ,,
40° ,,	64·3 ,, ,,
30° ,,	66·0 ,, ,,
20° ,,	70·0 ,, ,,
10° ,,	72·0 ,, ,,
Proof Spirit	74·0 ,, ,,
10° U. P.	77·0 ,, ,,
20° ,,	79·0 ,, ,,
25° ,,	81·0 ,, ,,
30° ,,	82·0 ,, ,,
40° ,,	85·0 ,, ,,
50° ,,	91·0 ,, ,,
60° ,,	96·0 ,, ,,

(*c*) Mixtures—

(i) *Ordinary Denatured Alcohol* (*a*)

60° O. P.		56·3 degrees F.		
50° „		62·0 „ „		

(ii) *The Suggested Power Alcohol and Mixtures* (*b*)·

Power Alcohol (55° O. P.)		60·6 „ „	
„ „ 85 per cent. petrol 15 per cent. (*c*).	Below	40·0 „ „	(*d*)
Power Alcohol 75 per cent. Ether 25 per cent.	„	40·0 „ „	(*d*)
(iii) Petrol	„	40·0 „ „	(*d*)
(iv) Ether (sp. gr. 0·726)	„	40·0 „ „	(*d*)

(*a*) Denatured with ½ per cent. pyridine and ½ per cent. caoutchoucine.

(*b*) Denatured with 1 per cent. pyridine, ½ per cent. caoutchoucine, and coloured.

(*c*) The maximum amount of petrol that power alcohol will hold in solution.

(*d*) The lower limit of the standard flash-point apparatus.